COASTAL PLANTING

Forests Commission, Victoria

COASTAL PLANTING IN VICTORIA

Many people have found it difficult to grow trees in the coastal areas of Victoria. While conditions may not be as favourable as further inland, a degree of success can be attained if appropriate measures are taken to cope with the unusual circumstances encountered.

Climatically, coastal areas in Victoria are suitable for a wide range of plants. Rainfall usually exceeds 25 inches per year and is reasonably well distributed ; severe frosts and freezing temperatures do not occur; and winds, while commonly blowing off the sea, are not persistent and only occasionally exceed 50 m.p.h. The failure of many plants to grow must be sought elsewhere and so far as Victoria is concerned is usually due to the effect of windblown salt, sometimes coupled with unfavourable soil conditions.

Exposure to Sea Winds

Trees tend to lean away from the prevailing wind, but the irregular shapes seen on almost any coastline are due mainly to salt damage. Winds blowing over the sea pick up salt from the spray and this causes the " scorching " of foliage often seen on seaside plants. Less resistant plants are killed, but the more salt-resistant survive, even though they may still suffer damage. The growing tips in particular are frequently killed, especially following stormy weather when there is much more salt spray in the wind, so that over a period of years plants tend to " grow away " from the sea and develop into a variety of stunted and peculiar shapes. Often a tall-growing plant may be reduced to a mere shrub. The native brown stringybark (*Eucalyptus baxteri*) for example, under forest conditions can grow to 120 feet ; but in exposed coastal areas it may be reduced to a bushy, sprawling plant less than 5 feet tall. There are many other species that develop into upright trees when growing under equally windy conditions inland, but in coastal areas they either do not survive or form stunted and oddly shaped plants.

Unfavourable Soil Types

On the better soils, such as those derived from volcanic parent material or where the topography is steep as on the Otway Peninsula, soil conditions are usually not a limiting factor. But in most of the Victorian coastal areas, soils are usually not good and the poor soils are often as much a cause of failure as wind-borne salt.

Broadly, unfavourable soils can be classed as :—

(*a*) Deep sands.
(*b*) Clay soils.
(*c*) Miscellaneous.

(*a*) *Deep Sands.*

These either occur along the immediate sea front as loose drifting sands, e.g., sand-dunes, or form extensive areas of flat sandy country extending up to several miles inland.

They are deep soils, usually extending for 10 to 20 feet or more in depth, and under natural conditions appear to be largely stabilized by vegetation. Generally this soil type occurs where the land rises very gradually from the water's edge, i.e., where there are no cliffs along the seashore, for example, parts of Port Phillip Bay (Mordialloc, Seaford), Ninety Mile Beach and Portland Bay. Geologically speaking they are young soils and have only been formed in very recent times.

(*b*) *Clay Soils.*

At first glance these are commonly called sandy soils as the surface layers are usually black or dark grey sand ; but underneath, at anything from 3 inches to 24–30 inches depth, an impervious heavy clay is found. This clay layer restricts vertical drainage so that the soil is often water-logged up to within a few inches of the surface, though the surface may appear dry and well drained. Soils of this type are usually found where cliffs of 8–10 feet or more in height occur along the shoreline, for example, Mt. Eliza, Port Campbell, Anglesea and Wonthaggi. They are formed on dissected peneplains and compared with the deep sands are comparatively old soils.

(*c*) *Miscellaneous.*

Occasionally other factors can be limiting but these are relatively uncommon.

(i) *Limestone Areas.*—Soils with limestone outcrops or rock within about 4 to 5 feet of the surface can be a very difficult problem as the soil is usually strongly alkaline and not many species will grow under these conditions. Where the depth to rock is about a foot or so, deep ripping may help but careful selection of species is still necessary and you are advised to seek further information before commencing planting.

(ii) Excess acidity or alkalinity great enough to have an adverse effect on plant growth is known for one or two coastal areas, but as these are in the remoter parts of the State the average person is unlikely to encounter them.

(iii) Saline soil conditions can occur, as a large volume of salt is blown over the land each year ; but because of the frequency of coastal showers and porosity of the sand the salt is just as quickly removed from the root zone. In practice, salting troubles are far more likely to be troublesome well inland than along the coast. Probably the only areas where saline soil conditions could be a major limiting factor are exposed sites with a heavy clay soil and growing little else than tussock grass, as for example on parts of Phillip Island.

Site Improvement

Although a few plants can survive and grow under the prevailing coastal conditions, if some action is taken to improve the site the range of plants that can be grown is increased very greatly. The more effort that is put into this aspect the better will be the results.

Each planting project must be considered to determine whether salt spray or both salt spray and soil type are the main limiting factors. In every coastal area it can be taken for granted that salt spray troubles will occur sooner or later unless protective measures are taken. In most areas it is probable that soil conditions will also be unfavourable as the areas of good soils along the coastline in Victoria are limited in extent ; usually they are either deep sands or clay types as described above.

Protection from Winds

Some form of screening on the sea front is necessary to " filter out " the wind and salt spray. Either hardy plants or special structures can be used. Plants are better if they can be established, but in some circumstances artificial windbreaks may be required.

Artificial screens can be made from brush, laths, coarse hessian, or any cheap and readily available material that can be erected in the form of a fence. Whatever is used must impede the wind but not stop it ; i.e., it must be permeable to allow some of the wind to pass through as well as deflecting it over the top. If a solid structure such as a brick or stone wall, or cement-coated hessian is used, turbulence ("eddying") will occur on the lee side, particularly during storms, so that as much damage may be caused as if the structure was not there. A permeability of about 50 per cent. is best and this will give good protection about 80–100 feet behind the screen and some protection to 200 feet.

Plants form good permeable wind breaks, and even though you may not be able to see through them the wind travels through the foliage and is effectively restricted. With a reasonably dense but permeable wind break it is usually only the outer few feet that is affected by salt winds ; this gives enough protection to enable a wide range of plants to be grown within even 10 to 15 feet of the open ocean, provided soil conditions are satisfactory.

Soil Improvement

(*a*) *Deep Sands.*

These may vary from drifting sand, e.g., sand-dunes, to stabilized sands. With stabilized sands no special soil preparation beyond that undertaken for normal planting is necessary, but with drifting sands the drift must first be checked. Loose sand is liable to drift *en masse* and smother quite large plants ; but an equally serious problem in getting plants established is " sand blast "—the abrasion of the bark of small plants at ground level by sand grains blown along the soil surface.

The measures to control drift will depend on how serious the problem is. Artificial barriers like brush or lath fences, or ground cover such as brush laid on the sand may be necessary in severe cases. On large areas planting marram grass at 2 feet spacings will give good control after a few years and is necessary when sand " blows " are measured in acres rather than square yards. If the area is not blowing badly or is only a few square yards in extent, any sort of brush debris such as branches, large prunings, and long grass spread over the ground will arrest surface movement.

Sand dunes and sheets of sand near the sea front usually have good reserves of fresh water, even though the top few inches may be quite dry. At the lower depths, at sea level, the water will be salty ; but above this there is usually a layer of fresh water, which is an accumulation of rain water that has fallen on the sand and percolated down. Use is sometimes made of this water by planting long cuttings (over 2 feet long) of species such as tamarisk with only a few inches or a foot or so above the surface.

Not all deep sands are active ; there are large areas around the coast that have been stabilized by native vegetation. Obviously this should not be disturbed, but if additional plants or other species are desired, individual trees should be planted at wide intervals through the area and when these are established others should be planted between them.

(*b*) *Clay Soils.*

Here the problem is usually excess water ; the soil above the clay is saturated during winter and spring and does not dry out sufficiently for plant growth until late spring or early summer, when the peak of the growing season is over. Even so these soils are rarely devoid of vegetation under natural conditions.

The clay is usually very impervious so that water cannot soak through the soil quickly enough but must drain away slowly down the slope to lower levels. Unless the planting site is on the top of a hill, most of this ground water will be seepage from higher slopes rather than water that has fallen on the ground as rain. An open drain dug down to the clay across the top side of the planting area and leading down to the lower parts of the area will intercept and divert downhill seepage. A few internal subsidiary drains will also help, the number depending on the size of the area to be drained.

Planting sites need to be dug well to aerate the soil. Loosening the soil by ripping is a good practice provided it is done on the contour and leads into a drain at each end ; soil water will collect in the ripped line and must be drained away, otherwise the treatment will only result in the planting line becoming more waterlogged. Because of this extra water, ripping should not be done other than on the contour and particularly not up and down the slopes ; the loosened soil and the extra water collected in the rip line could easily start soil erosion.

Clearing should be kept to a minimum, as the sandy surface soil will " blow " once the vegetation has been removed. Even in tall scrub and large operations complete clearing should not be undertaken ; clearing along the planting lines is the most that can be advocated. However, the native vegetation found on clay soils forms a well developed mat of fine fibrous roots in the top 6 to 9 inches of soil and this must be thoroughly broken up in the planting hole. Cultivation in strips with disc plough or heavy disc harrows will break up most of this sward ; in smaller operations vigorous use of a spade is necessary.

Planting

Provided adequate protection and site preparation has been given, the actual planting is no different from anywhere else and with normal care no difficulties should arise.

During the first summer an occasional good watering during dry periods will help. Sandy soils hold very little moisture in reserve compared with loamy types, so that loss of plants from drought is more likely. Fertilizing is an advantage but because of the porous nature of the soil, frequent and light applications at about monthly intervals during spring, early summer and early autumn would be better than a single heavy application. Superphosphate is the main basic requirement, but blood and bone, complete fertilizers or animal manures will add other valuable nutrients as well. Fertilizers should be spread on the ground surface for a radius of 6–9 inches around each plant. Apply about one oz. of artificial fertilizer or ½ lb. of animal manure to each tree.

Suggested Species

A list of plants suitable for the coastal areas of Victoria is given below. They have been divided into three groups representing in a general way their resistance to salt spray and suitability for sandy soils.

Group 1. Will withstand conditions of severe exposure. Species marked with an asterisk are the hardiest and are recommended for very exposed sites.

Group 2. Will withstand moderate exposure, i.e., where some protection from a belt of vegetation is available.

Group 3. Will withstand slight exposure, i.e., where a fairly dense belt of vegetation exists between them and the seashore.

Species shown are evergreen and native (indigenous) plants except where marked E for exotic (introduced) and D for deciduous. Heights given are for positions with some shelter. As the degree of exposure increases, heights would be reduced, particularly on the very exposed sites where it could be only a fraction of that in a sheltered position.

Group 1

			Height (ft.)
Acacia floribunda		Catkin Acacia	8–12
Acacia longifolia		Sallow Wattle	12
*Acacia longifolia var. sophorae**		Coast Wattle	6–8
Acacia suaveolens		Sweet Acacia	6–8
*Araucaria heterophylla**		Norfolk Island Pine	80–100
Banksia integrifolia		Coast Banksia	20–30
*Banksia marginata**		Silver Banksia	15
Casuarina glauca		Grey Buloke	30
*Casuarina stricta**		Drooping She-oak	30
*Coprosma repens**	E	Mirror Plant	6
Cupressus glabra	E	Arizona Cypress	20–30
Escallonia macrantha	E	Crimson Jewel Bush	6–8
Eucalyptus gomphocephala		Tuart	20–30
Eucalyptus lehmannii		Bushy Yate	15–25
Eucalyptus robusta		Swamp Mahogany	40–60
Euonymus japonica	E	Spindle Tree	8
Hakea suaveolens		Sweet Hakea	5–10
*Lagunaria patersonii**	E	Pyramid Tree	25
*Leptospermum laevigatum**		Coast Tea-tree	15–20
Melaleuca armillaris		Giant Honeymyrtle	15
Melaleuca ericifolia		Swamp Paperbark	10–15
Melaleuca halmaturorum		Salt Paperbark	15
*Melaleuca lanceolata**		Moonah	20
Melaleuca squarrosa		Scented Paperbark	12–15
Metrosideros excelsa	E	New Zealand Christmas Tree	20–30
*Myoporum insulare**		Boobialla	15
*Pinus pinaster**	E	Maritime Pine	40–60
*Pittosporum crassifolium**	E	Karo	15–20
Pittosporum tenuifolium	E	Kohuhu	15–20
Prunus lusitanica	E	Portugal Laurel	10–20
Tamarix aphylla	E	Athel Tree	10–20
Tamarix parviflora	E	Tamarix	15
Templetonia retusa		Red Templetonia	3–6

Group 2

			Height (ft.)
Acacia baileyana		Cootamundra Wattle	12–15
Acacia cyanophylla		Orange Wattle	12–15
Acacia cyclops		W.A. Coastal Wattle	10
Acacia prominens		Golden Rain Wattle	15
Acacia pycnantha		Golden Wattle	12
Acacia saligna		Golden Wreath Wattle	15
Actinostrobus pyramidalis		Swan River Cypress	12
Agonis flexuosa		Willow Myrtle	20
Albizia lophantha	ED	Cape Wattle	20–30
Angophora floribunda		Rough-bark Gum Myrtle	30–40
Banksia ericifolia		Golden Banksia	10
Banksia prionotes		Orange Banksia	15–25
Banksia serrata		Saw Banksia	15–30
Callistemon citrinus		Crimson Bottlebrush	6–20
Callitris columellaris		Murray Pine	50
Cassia artemisoides		Silver Cassia	4–6
Casuarina cristata		Belar	30–50
Casuarina cunninghamiana		River She-oak	40–100

Group 2 (continued)

			Height (ft.)
Casuarina littoralis		Black She-oak	30
Ceanothus	E	Californian Lilac	6–8
Cortaderia selloana	E	Pampas Grass	15
Corynocarpus laevigata	E	New Zealand Laurel	15–25
Cotoneaster microphylla	E	Rockspray Cotoneaster	3
Cotoneaster pannosa	E	Silver-Leaf Cotoneaster	8
Cotoneaster serotina	E	Late Cotoneaster	6–8
Crataegus monogyna	ED	Hawthorn	12
Chamaecytisus proliferus	E	Tree Lucerne	10–15
Dodonaea angustissima		Slender Hop-bush	3–8
Dodonaea viscosa		Gaint Hop-bush	12–20
Eucalyptus botryoides		Southern Mahogany	40–60
Eucalyptus calophylla		Marri	20–30
Eucalyptus cornuta		Yate	25–30
Eucalyptus crucis		Silver Mallee	8–20
Eucalyptus eremophila		Tall Sand Mallee	10–25
Eucalyptus erythrocorys		Red-Cap Gum	10–30
Eucalyptus ficifolia		W.A. Red Flowering Gum	20–25
Eucalyptus leucoxylon		Yellow Gum	30–50
Eucalyptus steedmanii		Steedmans Gum	10–15
Eucalyptus stricklandii		Goldfields Gum	20–40
Eucalyptus tetragona		White-leaf Marlock	15–25
Genista species	E	Broom	6–8
Hakea elliptica		Oval-leaf Hakea	15
Hakea laurina		Pincushion Hakea	15
Hoheria populneus	E	New Zealand Lacebark	8–12
Ilex aquilifolium	E	Holly	10–15
Lantana sellowiana	E	Trailing Lantana	1–3
Lavandula officinalis	E	True Lavender	3–4
Lavandula stoechas	E	French Lavender	3–4
Leptospermum scoparium and varieties		Manuka	5–10
Ligustrum ovalifolium	E	Privet	4–10
Lonicera nitida	E	Honey Suckle	4
Melaleuca hypericifolia		Red-flower Paperbark	6–10
Melaleuca linariifolia		Flax-Leaf Paperbark	10–30
Melaleuca nesophila		Showy Honeymyrtle	8–30
Melaleuca styphelioides		Prickly Paperbark	20–40
Melia azedarach		White Cedar	25–40
Myrtus communis	E	Common Myrtle	8
Nerium species	E	Oleander	6–10
Pinus contorta	E	Lodgepole Pine	50–80
Pinus halepensis	E	Aleppo Pine	30–50
Pinus pinea	E	Stone Pine	30–60
Pinus radiata	E	Radiata Pine	75–100
Pittosporum phillyraeoides		Weeping Pittosporum	20–30
Pittosporum undulatum		Sweet Pittosporum	25
Psoralea pinnata	E	Pinnate Scurf-Pea	6–10
Quercus ilex	ED	Holm Oak	30–50
Raphiolepis indica	E	Indian Hawthorn	5–6
Rosmarinus officinalis	E	Rosemary	4
Schinus molle	E	Pepper Tree	12–20
Spartium junceum	E	Spanish Broom	8–10
Tamarix juniperina (japonica)	E	Juniper Tamarisk	12–15
Tamarix pentandra	E	Late Tamarisk	12

Group 3

			Height (ft.)
Acacia terminalis		Cedar Wattle	40–50
Acacia glaucescens		Coastal Myall	30–40
Acacia ligulata		Small Cooba	8
Acacia melanoxylon		Blackwood	40–50
Acacia pravissima		Ovens Wattle	20
Acacia pruinosa		Frosty Wattle	20–50
Acacia salicina		Willow Acacia	10–20
Acer pseudo-platanus	ED	Sycamore	30–40
Arbutus unedo	E	Irish Strawberry Tree	8–10
Berberis thunbergii	ED	Japanese Barberry	3–4
Buddleia globosa	E	Orange Buddleia	8–12
Buddleia veitchiana	E	Mauve Buddleia	8–15
Callistemon salignus		Willow Bottlebush	15–20
Callistemon speciosus		Albany Bottlebrush	8–15
Callistemon viminalis		Weeping Bottlebush	10–15
Calodendrum capense	E	Cape Chestnut	30–40
Cercis siliquastrum	ED	Judas Tree	10–20
Ceratonia siliqua	E	Carob	10–15
Choisya ternata	E	Mexican Orange Blossom	4–6
Cinnamomum camphora	E	Camphor Laurel	15–30
Cistus species	E	Rock Rose	3–5
Correa reflexa		Green Correa	2–6
Crataegus phaenopyrum	ED	Washington Thorn	15–20
Crataegus pubescens	ED	Mexican Hawthorn	15–20
Duranta repens	E	Sky Flower	8
Eleagnus pungens	E	Oleaster	4–6
Eucalyptus citriodora		Lemon-Scent Gum	50
Feijoa sellowiana	E	Pineapple Guava	8
Garrya elliptica	E	Catkin Bush	8
Gleditsia triacanthos	ED	Honey Locust	50
Grevillea robusta		Silky Oak	50–70
Hebe species	E	Veronica	4–6
Hibiscus rosa-sinensis	ED	Chinese Hibiscus	8
Koelreuteria paniculata	ED	Golden Rain Tree	20
Pinus nigra	E	Corsican Pine	40–60
Platanus orientalis	ED	Plane	80
Populus alba	ED	Silver Poplar	30–50
Populus nigra var. italica	ED	Lombardy Poplar	50–60
Quercus palustris	ED	Pin Oak	30–40
Ribes sanguineum	ED	Pink Flowering Currant	6–8
Salix babylonica	ED	Weeping Willow	30
Symphoricarpus racemosus	ED	Snowberry	4
Teucrium fruticans	E	Teucrium	3–4
Viburnum tinus	ED	Laurestinus	10
Virgilia oroboides	E	Cape Virgilia	15–20

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